REALLOCATION AND PRODUCTIVITY DYNAMICS
IN THE APPALACHIAN REGION

by

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Abstract

       The Appalachian Region has long suffered from poor economic performance as measured over a variety of dimensions. Even as the region has improved over the last few decades, Appalachia still lags behind the nation. A growing body of empirical work has found that reallocation is pervasive in the U.S. economy and is an integral component of economic growth. Productivity growth is improved when resources are shifted from less productive establishments towards more productive establishments either through changes in existing establishments or through the births and deaths of establishments. Establishments that use new products, technologies, and production processes replace establishments that do not in a continual process of creative destruction. Using establishment-level data, this paper examines the reallocation and productivity dynamics of the Appalachian Region. The first part of the paper compares the reallocation dynamics of Appalachia to the rest of the U.S. using a newly developed establishment-level database that covers virtually the entire U.S. economy. From this analysis, it is apparent that establishment birth and death rates and job creation and destruction rates for Appalachia are consistently below those for the rest of the U.S.. The second part of the paper uses data from the Economic Censuses to determine whether the establishment and employment dynamics of the Appalachian Region are also qualitatively different (in terms of their productivity rankings) from their U.S. counterparts. It appears that the North subregion of Appalachia has reallocation and productivity dynamics that are consistent with an impeded creative destruction story.

       JEL: J24, O47

1. Introduction

The Appalachian Region has long suffered from poor economic performance as measured over a variety of dimensions. Even as the region has improved over the last few decades, Appalachia still lags behind the nation. As compared to the U.S. as a whole, Appalachian poverty rates are higher (110% of U.S. rates in 2000), per capita income is lower (82% of U.S. rates in 2001), and unemployment rates are higher (105% of U.S. rates in 2001) (Appalachian Regional Commission (2005)). This paper examines whether the reallocation dynamics of the Appalachian Region differ quantitatively and qualitatively from the rest of the U.S.. A growing body of empirical work has found that reallocation is pervasive in the U.S. economy and is an integral component of economic growth (see Bartelsman, Haltiwanger, and Scarpetta (2004) for a review). Productivity growth is improved when resources are shifted from less productive establishments towards more productive establishments either through changes in existing establishments or through the births and deaths of establishments. Establishments that use new products, technologies, and production processes replace establishments that do not in a continual process of creative destruction.

Creative destruction as defined by Schumpeter (1942) is the process of industrial transformation that "incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one (p.83). " Caballero and Hammour (2000) similarly describe the creative destruction process as one in which "the production structure weeds out unproductive segments; upgrades its technology, processes, and output mix; and adjusts to the evolving regulatory and global environment (p.2)." Caballero and Hammour note that when the creative destruction process is impeded the results can be depressed creation, the

inefficient survival of low-productivity establishments, entry and exit that are inefficient in terms of productivity, and spurious reallocation. Brandow (2001) finds low establishment birth rates, high retention rates, better than average survival rates for births, and below average productivity for establishments that continue over time for the Appalachian Region. These findings suggest that the reallocation dynamics in the Appalachian Region are in some way fundamentally different than those for the rest of the U.S.. This paper pursues this line of inquiry by extensively detailing the reallocation dynamics in the Appalachian Region and by examining the reallocation's impact on productivity.

Three essential ingredients drive the creative destruction process: within-sector heterogeneity; large and persistent reallocation; and reallocation dynamics that shift economic activity from low productivity establishments to high productivity establishments. Numerous studies have found large-within sector heterogeneity of inputs, outputs, and productivity growth in the U.S.. The large within-sector heterogeneity implies that idiosyncratic factors are an important determinant of which establishments enter or exit, create or destroy jobs, and experience productivity growth or declines. Establishment-level heterogeneity can arise from uncertainty concerning new products and production processes and the demand for these new products; establishment-level differences in managerial ability, capital vintage, location, and disturbances; and diffusion of knowledge. These differences in establishments have been found to persist over time. The large, ongoing, and persistent reallocation of economic activity in the U.S. manufacturing sector is well-documented in Davis, Haltiwanger, and Schuh (1996). Davis and Haltiwanger (1999) note that about one in ten jobs are destroyed and one in ten jobs are

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created in the U.S. in each year. This churning is pervasive throughout the world and is found in both developing and developed countries (see Bartelsman, Haltiwanger, and Scarpetta (2004)).

The last essential ingredient for creative destruction is that the reallocation be from less productive establishments towards more productive establishments. In the creative destruction models of economic growth the process of developing new products and adopting new processes necessarily involves the destruction of old products and processes. In some versions of creative destruction models of economic growth, these new processes and products can be introduced only through new establishments. Entry and exit, which necessarily require the reallocation of inputs and outputs, are the drivers of economic growth in this type of model. A less strict view of technology and product adoption is that these can be adopted by existing establishments but with some costs of retooling. In this case, reallocation can occur not only through net entry but also through between-establishment reallocation and within-establishment changes (see Bartelsman, Haltiwanger, and Scarpetta (2004) for a discussion of different models). It is this less strict view of the creative destruction process that lies behind the empirical exercises in this paper.

In each of these models, economic growth is determined to some extent by the reallocation of inputs and outputs across establishments. If this process of creative destruction is impeded, for example by government policies or market imperfections, then economic growth will be negatively affected. Not surprisingly, this notion of impeded creative destruction has been studied in developing and transition economies. For example, Caballero and Hammour (2000) describe such impediments as a constrained contacting ability in the financial and labor markets that work to depress reallocation. Brown and Earle (2001) find for Russia that "privatization and domestic liberalization (allowing domestic firm to compete with one another)

have not led to greater job destruction overall, but rather have helped to focus the destruction in the firms that need it the most (p.22)."

The remainder of this paper is organized as follows. Data and measurement issues are discussed in Section 2. The Appalachian Region is described in Section 3. Section 4 compares the reallocation rates of Appalachia to the rest of the U.S. using a newly developed establishment-level database that covers virtually the entire U.S. economy. The evidence from these exercises is that the establishment birth and death rates and job creation and destruction rates for Appalachia are consistently below those for the rest of the U.S.. Section 5 of the paper uses data from an Economic Census to determine whether the reallocation dynamics of Appalachia are also qualitatively different (in terms of their productivity rankings) from their U.S. counterparts. This section of the paper focuses on the retail trade sector because recent empirical work has shown that reallocation plays an important role in the productivity dynamics of this sector (see Foster, Haltiwanger, and Krizan (in press)). Section 6 concludes.

The empirical analyses in this paper are also performed for the three subregions of Appalachia (Central, North, and South). These subregions are defined by the Appalachian Regional Commission based upon county location. The subregion analysis is necessary because the subregions experience very different reallocation dynamics and outcomes. Existing work has shown that South has experienced increasingly positive outcomes over a variety of measures, North has experienced a decline over time, and Central has remained mostly unchanged in a depressed state. Isserman (1996) summarizes the socio-economic state of the Region as "Central

Appalachia has the most poverty, and Northern Appalachia the least growth (p.13).[1] To preview

the results, it appears that South continues to have a strong economic performance in part due to

reallocation, Central has a relatively weak economic performance due to its reliance on declining

industries, and North has a relatively weak economic performance which is consistent with a

story of impeded creative destruction.

One must be careful about drawing conclusions about creative destruction based on

comparisons across these areas since the exercises do not control for differences in shocks to the

areas. In the same vein, it is not necessarily the case that all reallocation is efficient. In some

cases, reallocation is inefficient because agents do not internalize the impact of their actions on

others (see Aghion and Howitt (1992)) and in other cases this is due to time lags related to the

sunkness of investment capital (see Caballero and Hammour (1996)). In addition, the

reallocation of workers across establishments and the exit of establishments impose costs upon

those who endure them.

2. Data and Measurement Issues

This paper relies on two establishment-level datasets. The Longitudinal Business

Database (LBD) is used to describe the reallocation of establishments and employment in the

U.S. and Appalachian Region. The broad coverage of the LBD means that it ideal for capturing

reallocation dynamics. Unfortunately, the LBD does not include output information and so it

cannot be used to analyze the productivity of establishments. In order to examine productivity

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[1] Jensen (1998) examines the establishment dynamics of the manufacturing sector and finds that
"there is considerable variation with the Region, with the South experiencing the most favorable

and reallocation it is necessary to turn to Economic Census data which include both labor input and output measures and are collected by sector. The retail trade sector is an ideal choice for this analysis because it is a growing sector and because existing work has shown that reallocation contributes importantly to productivity growth in this sector (see Foster, Haltiwanger, and Krizan (in press)).

The LBD is a recently developed establishment-level database linking the Census Bureau's business register list (see Jarmin and Miranda (2002)). The LBD data cover nearly all of the non-farm private U.S. economy. This paper uses data from the LBD concerning location, industry classification, parent firm, and employment. Employment data on the LBD are measured as employment at the establishment during the pay period that includes March 12th. In order to maintain high data quality, only data in years and industries covered by an Economic Census are used in this paper.[2] The final dataset consists of approximately 6 million establishments and 87 million employees in each census year.

The productivity measures are created using data from the Census of Retail Trade (CRT) which is a survey of retail trade establishments conducted every five years. The survey questionnaire is mailed out to all large and medium-sized firms and generally all firms that operate multiple establishments; most very small firms are excused from answering the questionnaire. The data for these very small firms come from a Census sample of these very small firms and administrative records from other federal agencies. The CRT contains data on

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outcomes over the period and the North slipping relative to the national experience (p. i)."
  [2] The data are for 1982, 1987, 1992, and 1997 and exclude establishments in the agriculture, forestry, fishing, railroads, educational establishments, labor unions, religious or political organizations, and government sectors.

establishments concerning the kind of business, physical location, sales in dollars, annual and first quarter payroll, and employment for the pay period including March 12th. The CRT establishments can be linked over time for the years 1987, 1992, and 1997.

The index of establishment-level labor productivity used is standard in the literature and is measured as the difference between log real gross output and log total hours (see Foster, Haltiwanger, Krizan (in press) for a detailed discussion concerning this measure). Log real gross output is measured by deflating sales using BLS' four-digit industry deflators. Total hours are constructed by multiplying establishment employment by BLS' industry average of hours. The adjustment for hours is crude and should be interpreted as a means of controlling for detailed industry and time variation in hours per worker. There are approximately 1.5 million establishments in the retail trade sector employing close to 20 million workers and generating close to $2 trillion in sales on average for these three census years.

Since the two datasets will be used to jointly describe creative destruction in Appalachia it is important to check their consistency over the relevant measures. The results of consistency checks are reported in the Section 4.3 and the Data Appendix. To summarize, the datasets are consistent, but reallocation rates are higher when relying upon CRT than when using the LBD.

3. Background Characteristics of Appalachia

The Appalachian Region, as currently defined by the Appalachian Regional Commission, consists of 414 counties in thirteen states running from New York to Mississippi. There are approximately 6 million establishments and 87 million employees in the U.S. and 0.4 million

establishments and 6 million employees in the Appalachian Region on average in the LBD dataset.[3] The number of establishments and employment are growing over the sample period of for Appalachia and the U.S.. This section describes some of the background characteristics of Appalachia that are relevant to reallocation dynamics. Differences in these characteristics are controlled for in some the empirical exercises that appear in later sections.

Economic activity in Appalachia is less concentrated in metropolitan areas than is the case for the U.S. as a whole. Metropolitan areas account for about 60 percent of establishments and 65 percent of employment in Appalachia, while in the U.S. as a whole they account for about 80 percent of establishments and 85 percent of employment. The Appalachian Region has historically been reliant on the mining, agricultural, and manufacturing sectors for economic activity. Over the time period of this study, economic activity in the U.S. has shifted away from these sectors. A similar shift in economic activity has also occurred for the Appalachian Region over the sample period. Employment in services and retail trade grow steadily over time in both the U.S. and Appalachia. However, there are still important differences between Appalachia and the U.S. in terms of industry. It is still the case that the share of employment in Appalachia relative to the rest of the U.S. is disproportionately large in mining and manufacturing and disproportionately small for the finance, insurance and real estate sector. The difference in the industry compositions between Appalachia and the U.S. impacts many of the establishment and employment dynamics.

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[3] The current definition of Appalachia is used over the entire sample period. The establishment and employment counts in this section are for all establishments with positive *payroll*. In the sections concerning dynamics, the sample is necessarily restricted to establishments with positive *employment*.

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Establishments in Appalachia are slightly larger and more slightly likely to be part of a multi-unit firm than establishments in the rest of the U.S.. The size of an establishment (as measured by its employment) reveals something about the preferred scale of operation and the technology of the establishment. The existing literature has shown that employment churning decreases as establishment size increases (Davis, Haltiwanger, and Schuh (1996) and Foster, Haltiwanger, and Krizan (2002)). The firm structure is relevant since existing work (on manufacturing) has shown that relative to single unit establishments, multi-unit establishments experience less employment churning (Davis, Haltiwanger, and Schuh (1996)) and in Appalachia have higher productivity than single unit establishments (Jensen (1998)).

As noted in the Introduction, the three subregions of Appalachia are heterogeneous. The Central subregion has far less economic activity than the North and South subregions. Central accounts for about 10 percent of the establishments and employment in Appalachia with North and South roughly evenly accounting for the rest of the economic activity of Appalachia. Over the sample period, the North-South subregions division of economic activity has shifted so that the North subregion relinquishes it dominance to the South subregion (the shift in shares is about 5 percent).

Not only does the Central subregion have far less economic activity than the other subregions, but this activity is also far less likely to take place in metropolitan areas. While approximately 60 percent of economic activity takes place in metropolitan areas for North and South, only about 20 percent of economic activity takes place in metropolitan areas for Central. These differences in metropolitan-non-metropolitan distributions are one of the reasons why the Central Region is most similar to the general perception of "Appalachia."

The difference in industry compositions is the other reason that Central mostly closely matches the general perception of "Appalachia." Relative to the U.S., Central has disproportionately more of its employment in mining, North has disproportionately more of its employment in mining and manufacturing, South has especially high employment shares in both construction and manufacturing. Central establishments are slightly smaller and North and South establishments are slightly larger than establishments in the rest of the U.S.. Economic activity at branch establishments is slightly lower in Central than in North and South in terms of both establishment and employment shares.

4. Reallocation in the Appalachian Region

The reallocation of economic activity across establishments is measured in terms of establishment births and deaths and job creation and destruction. Reallocation is measured across the entire economy thus giving a detailed picture of these dynamics in the U.S. and the Appalachian Regions (and its subregions). The analysis of the total economy in this section builds upon the analysis in Foster (2003). The last subsection of this section of the paper gives an overview of reallocation in the retail trade sector in order to provide some comparability to the productivity exercises that follow in Section 5.

4.1 Establishment Births and Deaths

The status of an establishment is defined for a pair of years $(t, t+5)$ based upon the values of employment in those two years. Establishment births and deaths are designated based upon positive establishment employment in order to be consistent with the employment flows definitions. Births have zero employment in t and positive employment in $t+5$, continuers have

positive employment in both *t* and *t+5*, and deaths have positive employment in *t* and zero

employment in *t+5*. Since the focus is on five-year intervals, these measures will by

construction miss any establishments that are created and then destroyed within the five-year

interval.

The establishment birth and death *rates* are calculated so that there is symmetry in the

treatment of births and deaths and a natural connection between establishment dynamics

weighted by employment and the job creation and destruction measures. The entry (exit) rate for

period *t* to *t+5* is measured as the number of entrants (exiters) between *t* and *t+5* divided by the

average number of establishments in *t* and *t+5*. Using these measures, the employment weighted

establishment birth rate (death rate) is the same as the rate of job creation due to births (job

destruction due to deaths). One must take care in interpreting differences in the rates across the

two areas since the pace of reallocation will also reflect differences in shocks that the two areas

face.

The establishment birth and death rates for the U.S. and for Appalachia for the three time

periods are shown in panel A of Table 1. There is a decline in establishment birth rates and a

slight decline in establishment death rates for both the U.S. and Appalachia over time.

Appalachia consistently has lower establishment birth rates than the U.S. (43 percent versus 45

percent averaged over the time periods) and the difference is relatively constant over time.

Appalachia also has lower establishment death rates than the U.S. (33 percent versus 36 percent

averaged over the time periods) but the gap between the Appalachia and the U.S. rates widens after the first period.[4]

The establishment birth and death rates by subregions are also shown in panel A, Table 1. South has the highest birth rate followed by Central and then North. The patterns are generally stable over time but in 1987-92 South has a drop in birth rates and increase in death rates (which mirrors the experience of the U.S. economy). Otherwise, the discrepancy in the birth rates is relatively stable over the three time periods, even as all three regions experience a decline in birth rates. The death rates for North and South are relatively similar and are lower than those for Central. The death rates for the three subregions converge over time.

In order to test the significance of these differences, the establishment-level data are pooled and logistic regressions are used to examine differences in the probability that an establishment is a birth (death) in Appalachia as compared to and the *rest of the U.S.* (the comparison group is not the U.S. as a whole). The subregion version of the regression is the same except that the Appalachian Region dummy is replaced by three regional dummies. A version of the logistic regression includes controls for other differences in Appalachia and the rest of the U.S. The controls include industry dummies at the two-digit industry level, size class dummies, a branch activity dummy, metropolitan location dummy, and year dummies. The regressions with the controls are included to give a sense of how the reallocation rates would look if Appalachia had characteristics more similar to those of the rest of the U.S.. The most

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[4] These establishment death rates are in line with those found by Dunne, Roberts, and Samuelson (1989) for the U.S. manufacturing sector.

important differences between Appalachia and the rest of the U.S. that can be controlled for are differences in industry distribution and metropolitan status.

The results for the regressions comparing Appalachia (and its subregions) to the rest of the U.S. are shown in panel B of Table 1. The negative and significant coefficients on the Appalachian dummies in the first two columns indicate that the probability that an establishment is a death or a birth is lower if the establishment is in Appalachia. Even when controlling for differences in other characteristics, the probability that an establishment is a death or a birth is lower if the establishment is in Appalachia (the third and fourth columns).[5] Controlling for other characteristics slightly widens the gap between Appalachia and the rest of the U.S. for exits, but narrows the gap between Appalachia and the rest of the U.S. for entrants.

The results by subregion reveal interesting differences. An establishment in North has lower entry and exit probabilities than the rest of the U.S. (this pattern holds when controlling for differences in characteristics). In contrast, an establishment in South has a higher probability of being an entrant than is the case for the rest of the U.S. but a lower probability of being an exit (this pattern holds when controlling for differences in characteristics). An establishment in Central has a lower probability of being an entrant than is the case for the rest of the U.S. but a higher probability of being an exit. Interestingly, controlling for other differences does make a difference for Central. When controlling for other differences, the probability that an establishment in Central is an entry suddenly becomes greater than it is for the rest of the U.S. and the probability that it is an exit becomes very close to the probability for the rest of the U.S..

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[5] These regressions were also run in linear probability form as a robustness check. The results are qualitatively similar to the results using the logistic.

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The controls that have the greatest impact are industry and metropolitan status. In sum, North is less dynamic on the entry and exit margins; South is dynamic on the entry margin and less so on the exit margin; and Central is less dynamic on the entry margin until one controls for other differences in the region.

4.2   Employment Creation and Destruction in the Appalachian Region

Job creation and destruction rates are calculated using the methodology from Davis, Haltiwanger, and Schuh (1996). The job creation (destruction) rate is measured as the weighted average of the employment growth rates of expanding (contracting) plants including the contribution of entering (exiting) establishments. The employment growth rates are measured as the change in employment between t and $t+5$, divided by the average of employment in t and $t+5$. This measure of growth rates is the preferred measure since it is symmetric about zero and can incorporate establishment births and deaths. Thus the net employment growth rate can be decomposed into job creation rate and job destruction rates. The sum of the job creation and destruction rates, measures the total amount of job reallocation that is occurring in the economy.

As background, the U.S. and the Appalachia have positive net employment growth over all three time periods. While the U.S. experiences a slowdown in employment growth during 1987-92, Appalachia experiences increasing employment growth over all three periods. Apart from the second period, the net employment growth rates for Appalachia are slightly below those for the U.S.. The net employment growth rates for North and Central are very similar: both have almost zero net employment growth in the first period and then weak employment growth in the subsequent periods. In contrast, South has strong net employment growth in the first and third

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periods with a slowdown in the rate of growth in the second period (which mirrors that for the U.S. as a whole).

Underlying these net employment growth rates is a significant amount of employment churning. The job creation and destruction rates for the U.S. and Appalachia are shown in panel A of Table 2. The job creation rate exceeds 45 percent and the job destruction rate is about 35 percent for the U.S. in all three time periods. The job creation and destruction rates for Appalachia are a bit lower, about 43 percent and 33 percent respectively. The slowdown in net employment growth in the U.S. for 1987-92 is the result of both a decrease in job creation rates and an increase in job destruction rates. In contrast, job creation and destruction rates in Appalachia decline over all three periods.

The job creation and destruction rates for the three subregions are also shown in panel A of Table 2. South has the highest job creation rates and lowest job destruction rates of all the subregions (the exception is in job destruction rate in 1987-92). As far as the other two subregions are concerned, North has relatively low job creation and destruction rates as compared to Central. The job destruction rates converge over time for the three subregions.

In order to check the significance of these differences in employment dynamics, the establishment-level data are pooled and employment share-weighted regressions are run of the growth rates on a dummy variable for the Appalachian Region and relevant establishment-level controls. The growth rates are net employment, job creation, job destruction, and total reallocation. Since the regressions are weighted by the (average) employment share, the

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coefficients correspond to the aggregate measure of the growth rate concept being estimated.[6]

For example, the coefficient on the Appalachian dummy for the net employment regression

shows the percentage point difference in the net employment growth rate for Appalachia as

compared to the rest of the U.S.. When the comparison group is the subregions of Appalachia,

the Appalachian Region dummy is replaced by three regional dummies. A version of the

regression includes controls for other differences in Appalachia and the rest of the U.S.. The

controls include year dummies, industry dummies, a branch activity dummy, and a series of size

class dummies.

The regression results for summary job flows (net employment and total reallocation) and

job creation and destruction rates are shown in panels B and C of Table 2. On average across

all of the years in the study, the Appalachian Region has lower net employment growth (1.6

percentage points lower) and lower job creation (4.5 percentage points lower) and job destruction

(3 percentage points lower) and hence lower reallocation than does the rest of the U.S.. When

controlling for industry, firm type, size, and years, the Appalachian Region has higher net

employment growth than does the U.S. (1.8 percentage points higher). Controlling for

differences in characteristics significantly narrows the difference in the job creation rates

between Appalachia and the rest of the U.S. and slightly narrows the difference in job

destruction rates.

The regression results for the job flows by subregions are also shown in panels B and C

of Table 2. South has higher net employment growth rates than does the rest of the U.S.

reflecting the South's lower job destruction rates (the job creation rates in the South are slightly

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[6] Davis and Haltiwanger (1999) use this form for their plant-level regressions.

lower than for the rest of the U.S.). When controlling for other factors, the South has both higher job creation rates and lower job destruction rates relative to the rest of the U.S.. Central has lower net employment growth rates than does the rest of the U.S., but when controlling for differences in other characteristics its net employment growth rate is *higher* than it is for the U.S.. The industry controls are responsible for this shift, which is not surprising given that Central is heavily dependent on the mining and manufacturing sectors. The job destruction rates for Central exceed those for the rest of the U.S., but are lower when controlling for differences in characteristics. When controlling for other differences, Central still has job creation rates below those for the rest of the U.S.. North has net employment growth rates lower than those of the rest of the U.S. even with controls, suggesting that North's problems are more complex than Central's problem of over-reliance on slow growth industries. North's low net employment growth reflects too little job creation rather than too much job destruction (whether controlling for other factors or not).

4.3   Reallocation in the Retail Trade Sector

The previous subsections have provided an in-depth comparison of the reallocation dynamics in the U.S. and Appalachia for the *entire economy* using the *LBD*. Section 5 will examine the reallocation and productivity dynamics of the U.S. and Appalachia for the *retail trade sector* using the *CRT*.   This subsection of the paper provides a bridge between the two levels of aggregation and the two different data sources in two steps. The first step compares reallocation dynamics in retail trade to those for the total economy (using the LBD). The second step compares reallocation dynamics in the LBD to those in the CRT for the retail trade sector.

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The reallocation dynamics in retail trade using the LBD are shown in panel A of Table 3. The left side of the table shows the establishment birth and death rates while the right side shows the job creation and destruction rates (for the two time periods that are covered by the CRT). Death rates are higher and birth rates are slightly lower in retail trade than in the total economy (compare to Table 1, panel A). Nevertheless, the U.S.-Appalachian gaps in birth and death rates are similar for retail trade and the total economy. In retail trade, as in the total economy, Appalachia has lower birth and death rates than the rest of the U.S.[7] The ranking of birth rates in subregions is the same in retail trade as in the total economy (South has the highest and North has the lowest birth rates). The death rates in retail trade converge more closely over time than they do for the total economy.

The job creation and destruction rates for retail trade are higher than they are for the total economy, but do follow the same general time trends of rising creation rates and falling destruction rates (compare to Table 2, panel A). As was true for the total economy, in retail trade the job destruction rates for Appalachia are lower than they are for the U.S.. However, unlike the total economy, in retail trade there is hardly any difference between the job creation rate Appalachia and the U.S. (the job creation rate in retail trade for Appalachia is noticeably higher than it is for the total economy).[8] The job creation rates and job destruction rates are

[7] There are some sectors in which Appalachia does not have lower birth and death rates than the U.S. For example, the birth and death rates for mining in Appalachia are generally higher than those for the U.S.

[8] The job creation and destruction rates for Appalachia generally closely mimic those for the U.S. over most of the other sectors of the economy as well. Sectors with relatively low creation and destruction rates in the U.S. tend to have low creation and destruction rates in Appalachia (such as manufacturing). One difference between retail trade and the rest of the economy is that the net employment growth rate is higher for Appalachia than the U.S. over all three time periods.

higher in retail trade than in the total economy for each subregion in Appalachia. The ranking of subregions by job creation rates is the same for retail trade as for the total economy (highest to lowest: South, Central, and North). The ranking of subregions by job destruction rates for retail trade is the same as for the total economy in the first period, but in the second period Central exhibits a large decline in the job destruction rate similar to that of South, leaving North with the highest job destruction rate.

The impact of using CRT data as compared to LBD data to measure reallocation dynamics in retail trade can be seen by comparing panel B to panel A in Table 3. The CRT version has higher birth and death rates than its LBD counterpart which is to be expected since the LBD analysts repaired broken establishment links and thus the LBD is less likely to have false births and deaths. The importance of net entry in the exercises that follow using CRT is then likely to be overstated to the extent that some of this measured net entry is actually false births and deaths. The difference in birth and deaths rates between the two datasets is basically a constant thus the ranking of regions and subregions is preserved across the different datasets.

The CRT generally has higher job creation and destruction rates than does the LBD (again, compare panel A and panel B of Table 3). The difference in CRT and LBD rates is generally close to a constant and so the gap between the U.S. and Appalachian rates is maintained over the different data sources. Similarly, the ranking of the subregions stays relatively the same over the differences in the data sources for job creation rates (South generally has the highest job creation rates while North has the lowest job creation rates). The job destruction rates also generally differ only by a constant across the two datasets in the first period, but become more compressed over time.

5. Creative Destruction in the Appalachian Region

The previous section has shown that the pace of reallocation in Appalachia is lower than it is for the U.S. for the economy as a whole as is evident in Appalachia's relatively lower establishment birth and death rates and job creation and destruction rates. Some empirical exercises tested for these differences by comparing Appalachia to the rest of the U.S.. When focusing on the retail trade sector, the differences between Appalachia and the U.S. are less noticeable on the job creation side otherwise the story of less reallocation in Appalachia applies to the retail trade sector. This section now looks at whether the quality of the reallocation differs as well as the pace of reallocation for Appalachia as compared to the U.S. as a whole.

5.1   Establishment Types (High or Low Productivity) and Their Dynamics

The salient characteristics of the productivity distributions for the U.S. and Appalachia are described in this section. It is of interest whether there are discernable types of establishments in terms of their productivity and whether the dynamics of these types are consistent with a creative destruction story. The analysis focuses first on whether establishments can be classified in terms of their productivity and whether any differences are persistent. The analysis then turns to whether low productivity establishments exit more than their high productivity counterparts. The first exercise looks at the distribution of (log of) labor productivity per hour across establishments within the same industry for 1987 and 1997. Consistent with the existing literature, there is evidence of much heterogeneity across establishments' productivity even when holding industry constant. In both 1987 and 1997, there

is about a 60 percent difference in productivity between the first and third quartiles for the U.S. and about a 50 percent difference for Appalachia. Thus, the productivity distribution for Appalachia seems to be a slightly more compressed. As for the regions of Appalachia, the interquartile range is largest for Central and smallest for North.

The second exercise examines whether this heterogeneity of establishments is persistent so that there are different types of establishments coexisting at one time or if establishments transit quickly into and out of productivity states. The movement of establishments across productivity types can be summarized in a transition matrix. The transition matrix groups establishments according to their hours-weighted productivity ranking holding industry constant so that each cell in the matrix shows the percent of observations that started in that row's productivity group and then moved to the productivity group represented in the column (the matrix is not shown). The immobility of establishments can be summarized by the trace, where a higher trace indicates lower mobility. The trace for Appalachia is slightly higher than that for the U.S., indicating that there is slightly less mobility in the Appalachian Region across productivity groups. However, when controlling for differences in birth and death rates, a comparison of the traces indicates Appalachian continuing establishments are slightly *more* mobile than U.S. continuing establishments.

It is also possible to compare upward and downward mobility. A comparison of the sums of the upper and lower triangular entries reveals both the U.S. and Appalachia have more downward mobility than upward mobility. While Appalachian and U.S. continuing establishments have about the same amount of upward mobility, Appalachian continuing

establishments have slightly more downward mobility.[9] A comparison of the traces for the subregions of Appalachia reveals that South has the most mobility of the regions (even when controlling for differences in birth and death rates of the regions).

Leaving aside the continuing establishments, the transition matrix also reveals information on the nature of births and deaths. Figure 1 shows the births arranged by productivity group from the transition matrix in the upper panel and the deaths arranged by productivity group in the lower panel (the lowest productivity group is group 1). The percent of births is roughly constant across the productivity groupings for each of the areas, suggesting that establishment births do enter approximately randomly. However, the slight U-shape of the bars suggests that there is some tendency for births to either be the highest or lowest productivity establishments. This pattern holds for the U.S., Appalachia, and the subregions.

For all of the areas in the study, it is clearly the case that low productivity predicts exits. The lowest productivity group accounts for over 25 percent of the deaths while the highest productivity group accounts for about 15 percent of the deaths (for all areas). If the creative destruction mechanism is working better in the U.S. than in Appalachia, one would expect to see that low productivity predicted death in the U.S. but was less of a predictor in Appalachia. However, this is not the case, the bottom two quintiles of productivity accounts for 48.9 percent of the deaths in the U.S. and 50.1 percent of deaths in Appalachia. Within the Appalachian Region, South has a particularly strong concentration of its deaths in its two lowest productivity

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[9] When comparing these results to the productivity decomposition, keep in mind that the transition matrix includes the within and cross-term components of the decomposition.

groups. The next section of this paper decomposes productivity growth into reallocation and within effects.

5.2 Productivity Decompositions

Productivity growth can be decomposed into the components that reflect productivity growth within establishments and the reallocation of activity from less productive to more productive establishments (including via establishment births and deaths). Foster, Haltiwanger, and Krizan (2001) discuss alternate decomposition methodologies, the decomposition used in this paper is their preferred method:

$$
\Delta LP_{it} = \sum_{e \in C} s_{et-1} \Delta LP_{et} + \sum_{e \in C} (LP_{et-1} - LP_{it-1}) \Delta s_{et} + \sum_{e \in C} \Delta LP_{et} \Delta s_{et}
$$
$$
+ \sum_{e \in N} s_{et} (LP_{et} - LP_{it-1}) - \sum_{e \in X} s_{et-1} (LP_{et-1} - LP_{it-1})
$$

(1)

Where LP_{it} is the index of *industry* productivity, s_{et} is the share of establishment e in industry i of the labor input (total hours), LP_{et} is an index of *establishment-level* productivity, C denotes continuing establishments, N denotes entering establishments, and X denotes exiting establishments. The first term in this decomposition represents a within-establishment component based on establishment-level changes, weighted by initial shares in the industry. The second term represents a between-establishment component that reflects changing shares, weighted by the deviation of initial establishment productivity from the initial industry index. The third term represents a cross term (i.e., covariance-type) that shows whether businesses with large positive productivity changes are more likely to have decreased employment and vice-versa. The last two terms represent the contribution of entering and exiting establishments, respectively.

The between-establishment, entry and exit terms involve deviations of establishment-level productivity from the initial industry index. For a continuing establishment, this implies that an increase in its share contributes positively to the between-establishment component only if the establishment has higher productivity than average initial productivity for the industry. Similarly, an exiting establishment contributes positively only if the establishment exhibits productivity lower than the initial average, and an entering establishment contributes positively only if the establishment has higher productivity than the initial average. If industry-level productivity growth is primarily driven by common shocks (or analogously common adoption of some new technology) then the within effect should dominate. Alternatively, if implementing new technology can only be accomplished via entry then the net entry terms should dominate. Reallocation among continuing establishments may contribute positively to industry growth to the extent that the implementation of new technology at continuing establishments involves experimentation and associated reallocation. Note as well that idiosyncratic shocks will tend to generate offsetting between and cross terms for continuing establishments.

The results of this decomposition are shown in Table 4. Labor productivity growth was 11.53 percent in the retail trade sector for the U.S. over 1987-97. Only 15 percent of this growth came from within-establishment productivity growth, most of retail trade productivity growth came from reallocation. (These results are consistent with those reported in Foster, Haltiwanger, and Krizan (in press)). Part of this reallocation was simply the movement of activity from less productive to more productive continuing establishments (the between share), but most of the contribution from reallocation comes from net entry. Births were a relatively more important component than deaths, but both are significant contributors to productivity growth. The

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negative cross share reflects a negative covariance between labor productivity and employment changes, it is consistent with the notion that downsizing has been productivity enhancing over the period.

The decomposition of aggregate productivity growth for the Appalachian Region reveals that reallocation is even more important in this region than it is for the U.S. as a whole. The within establishment share, while still positive, is very small for the Appalachian Region. The movement of activity across continuing establishments is more important in Appalachia than it was for the U.S.. More impressive is the large share of the productivity growth accounted for by net entry in Appalachia. Net entry in Appalachia more than accounts for the aggregate productivity growth for the retail trade sector. Notice that the birth shares for Appalachia and the U.S. are the same, but that the death share in Appalachia is larger. This is consistent with the comparison of the transition matrices where exits were especially concentrated in low productivity establishments for Appalachia relative to the U.S.. That is, while the Appalachian Region has lower death rates for establishments, these deaths are more concentrated in low productivity establishments than is the case for the rest of the U.S.

The results for the subregions of Appalachia reveal some interesting differences across the subregions. The South has the highest productivity growth of the subregions. As usual, of the subregions, South tends to most closely resemble the U.S.. However even here there are noticeable differences. The within establishment share in South is low relative to the U.S. and the net entry share is higher relative to the U.S. (with a smaller birth share but larger death share). Recall that South has a particularly high concentration of low productivity establishments in its exiters. Central has relatively low productivity growth over the period. Interestingly, the within

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establishment productivity share is the highest for this subregion. The cross term is especially

large and negative in Central suggesting that downsizing as played an important role in

productivity growth in this region. Similarly, the death share is the largest for this subregion.

This importance of deaths was not as evident in the transition matrix. The birth share is the

smallest share relative to the other subregions, which is consistent with the transition matrix that

showed that the births for Central are especially concentrated in the low productivity groups.

Finally, North has the lowest productivity growth of all the areas. Most striking, North has a

negative within establishment share. Reallocation plays an important role in productivity growth

in North, especially through net entry. North's has an especially large birth share, which would

be somewhat surprising given North's low establishment birth rates over the entire economy, but

the transition matrix has shown that North births are more concentrated in the two highest

productivity groups. The exercises below examine the role of net entry in more detail.

5.3 Productivity and Entry and Exit

The significance of net entry is tested in a regression of (the log of) productivity on a set

of dummies indicating whether the establishment exited between 1987 and 1997 (YRDEA87),

entered between 1987 and 1997 (YRBIR97), a year effect to control for average differences in

productivity across the two years (YR97), and four-digit industry dummies (not reported) using

the pooled data.[10] The omitted group is continuing establishments in 1987 and the regression is

run separately for Appalachia and the U.S. as a whole. The specification is given by:

$$P_{et} = \Psi + \beta * YRDEA87_{et} + \delta * YRBIR97_{et} + \phi_i \sum_{i=1}^{63} Industry_{iet} + \upsilon * YR97_{et} + \varepsilon_{et} \quad (2)$$

The relevant results of this regression are shown in panel A of Table 5. The first column

of the table reports the coefficients on exits. In all cases, exiting establishments in 1987 have

significantly lower productivity than continuing establishments in 1987 (β<0). The coefficient on

exiting establishments is especially large for South establishments. Recall that the transition

matrix exercise showed that South has a particularly strong concentration of its deaths in its two

lowest productivity groups.

The second column in the table reports the coefficients on entrants. Entering

establishments in 1997 are more productive than incumbents in 1987 (δ+v>0), but less

productive than incumbents in 1997 (δ<0) for the U.S..[11] The reverse is true for the Appalachian

Region where entering establishments in 1997 are less productive than incumbents in 1987

(δ+v<0), but more productive than incumbents in 1997 (δ<0). This pattern in Appalachia is

primarily due to the dynamics in the North, but the South and Central also contribute to this

pattern. The North's births are more productive than either 1987 or 1997 incumbents, the South's

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[10] The regression specification is from Foster, Haltiwanger, and Krizan (in press). The results will differ slightly because of differences in how births and deaths are defined (using positive employment in this paper versus positive payroll).

[11] The coefficient on the entry dummy (δ) shows how entering establishments compare to incumbents *abstracting* from the overall growth. In order to compare births in 1997 to the incumbents in 1987, one must also consider the year effects (i.e., look at δ+v). Thus entering establishments in 1997 are more productive than incumbents in 1987 (δ+v >0), but less productive than incumbents in 1997 (δ<0).

and Central's births are less productive than either 1987 or 1997 incumbents. The F-test on the difference between entering and exiting establishments is highly significant, even after controlling for year effects.   Entering establishments have higher productivity than exiting establishments even while controlling for year effects ($\delta > \beta$) for all of the areas in question.

The third column of the table reports the coefficient on the year effect. Establishments in 1997 have significantly higher productivity than establishments in 1987 ($\nu > 0$) in the U.S., but not in Appalachian Region where establishments in 1997 actually have lower productivity ($\nu < 0$). Looking at the subregions of Appalachia, it is clear that this drop in productivity is due to the dynamics of the North. Recall that North is the only area that has a negative within component of aggregate productivity growth.

It is possible to examine the dynamics of these entering establishments in more detail by using information from 1992 to classify entrants by whether they entered in the 1987-92 cohort or the 1992-97 cohort. Classifying entering establishments in this way makes it possible to examine selection and learning effects. The regression that is run simply uses the earlier specification but with entrants are divided into entrants that entered between 1987-92 (YRBOLD97) and those that entered between 1992-97 (YRBYNG97):

$$
\begin{aligned}
P_{et} &= \Psi + \beta * YRDEA87_{et} + \eta * YRBOLD97_{et} + \mu * YRBYNG97_{et} \\
&+ \phi_i \sum_{i=1}^{63} Industry_{iet} + \upsilon * YR97_{et} + \varepsilon_{et}
\end{aligned}
\tag{3}
$$

The results are shown in panel B of Table 5 where the first column reports the coefficient on entrants that entered in the earlier cohort (i.e., are old, η) and the second column reports the coefficient on entrants that entered in the later cohort (i.e., are young, μ). Establishments that

entered earlier have significantly higher productivity than establishments that entered later ($\eta > \mu$) for all areas. These cohort effects could be driven by selection and or learning effects. The results could reflect that the entrants from 1987- 92 who make it to 1997 are more productive entrants (selection), or that the earlier entrants had more time to learn than the later entrants (learning). In addition, older cohort entrants have productivity that is higher than that of the 1997 incumbents ($\eta > 0$), but younger cohort entrants usually have productivity that is lower than that of the 1997 incumbents ($\mu < 0$). The exception concerning younger cohorts is for the North. Even the relatively young births have higher productivity than do the 1997 incumbents for the North ($\mu > 0$). Moreover, there is little difference between old and young births for North. One possibility is that North has barriers to entry which keep birth rates low, but which also induce some selection of stronger candidates among the births that do happen. Selection and learning effects as these North entrants age may not be as important as it is in the Central and South subregions where there are large differences between the young and old entrants (μ and η are very different).

6. Conclusions

This paper has examined whether the poor economic performance of the Appalachian Region relative to the U.S. can be attributed to differences in creative destruction. The answer to this question is complicated by the fact that the Appalachian Region encompasses three very different subregions. An examination of the Appalachian Region reveals that it has lower reallocation rates than does the rest of the U.S. but that the births and deaths that do occur

contribute importantly to the region's productivity growth in retail trade. In the transition matrix exercise, it is evident that the establishment deaths in Appalachia are concentrated in the low productivity establishments. A decomposition of the aggregate productivity growth for the retail trade sector reveals important reallocation contributions to productivity growth (both through entry and exit and through the reallocation of economic activity across establishments). The importance of net entry in Appalachia is confirmed in the regression analysis. Instead of a lack of creative destruction being the story, the striking fact about the Appalachian Region's productivity growth is that the productivity growth of continuing establishments is almost non-existent. When the focus turns to the subregions of Appalachia, however, there are some interesting stories that are consistent with differences in creative destruction over the subregions.

South is the subregion of Appalachia that is most similar to the rest of the U.S.. Its establishment birth and death rates and job creation and destruction rates are very similar to those for the U.S. when looking at the economy as a whole. South has the highest net employment growth rate for the entire economy and the highest aggregate productivity growth for retail trade of any of the subregions of Appalachia. As is the case for the U.S., most of this productivity growth is attributable to the reallocation of activity from less productive to more productive establishments (especially through establishment entry and exit). Some of the productivity growth does come from continuing establishment improving their productivity, but most comes from reallocation. The transition matrix shows that the South is particularly adept at shedding low productivity establishments through death. This is confirmed by the importance of death component in the aggregate productivity growth decomposition and in the large negative

exit dummy in the net entry regressions. Births are also an important source of productivity

growth in South according to the productivity decomposition.

Central is the subregion most closely like the popular idea of "Appalachia," it is more

non-metropolitan than the other regions and more dependent on mining and manufacturing than

the other regions. Central has the highest death rates of the subregions and relatively high birth

rates (but not as high as South's birth rates) when looking at the entire economy. The low job

creation rates and high job destruction rates of Central are the result mostly of the industries that

dominate Central. When the focus is on the retail trade sector, the differences in the death and

job destruction rates for Central as compared to the other subregions are smaller. Central's

productivity growth in the retail trade sector is actually higher than that for North over the

sample period. Central has the largest within component of aggregate productivity growth and a

positive year effect in the net entry regressions. It appears that continuing establishments are able

to improve their productivity performance in this region. The birth share of aggregate

productivity growth is relatively lower for Central, this appears to reflect the very low

productivity of entrants when they are young. The death share of aggregate productivity growth

of Central is large as compared to the other areas. In sum, Central's poor economic performance

appears to be more tied to the industry composition in the subregion than to reallocation issues.

As Central continues to shift economic activity away from these sectors, its economic

performance seems likely to continue to improve.

Whether examining the entire economy or the retail trade sector, the North subregion has

very low birth rates. North also experiences the lowest productivity growth of the areas studied.

The transition matrix for the North suggests that its births occur in more of the higher

productivity groups than is usual (looking at the two most productive groups). When focusing on the productivity dynamics of its births and deaths, it is striking how much the births that do exist contribute to aggregate productivity growth. In North, births are more productive than either 1987 or 1997 incumbents. Moreover, it is not only the old births that are more productive but also the young births. It may be that there are barriers to entry in the North that dampen the birth rates but that ensure that only the best possible candidates enter the market. When these entrants do come into the market, they tend to be high productivity establishments. Perhaps this is related to Brandow's finding that entering establishments in Appalachia have higher than average survival rates. The deaths in North are not as concentrated in low productivity establishments as is the case for the higher performing areas (i.e., the South). The death component of the aggregate productivity decomposition is lowest for North as is the exit dummy in the net entry regression. The North appears to suffer from not enough creation and not enough destruction of poorly performing establishments. The patterns in the North's economic performance and reallocation rates are consistent with a story of impeded creative destruction. An interesting area for future research would be to examine the reasons for these patterns in the North subregion. It could simply be a matter of differences in shocks facing North or it could be that there are truly some impediments to reallocation in the North subregion.

Data Appendix: Consistency of the LBD and CRT Data

The datasets are compared over three areas: summary statistics at the sectoral level, employment at the establishment level, and reallocation rates at the sectoral level. Table A1 presents the summary statistics for the retail trade sector using the LBD and the CRT. The retail trade sector is roughly the same size whether measured by the LBD or the CRT, but the LBD consistently has more establishments and employment than does the CRT. In general, the LBD and CRT show the same dynamics over time, the exception is that the LBD has a drop in the number of establishments in 1992 whereas the CRT has a continual increase in the number of establishments over time. Whether using the LBD or the CRT, the Appalachian Region comprises about 8 percent of the U.S. economy in terms of establishments and employment.

The establishment-level employment data are compared by merging the employment data from the restricted LBD dataset into the CRT data. The comparison population is only those establishments that the CRT designates as being in retail trade and which can be matched to the LBD. Approximately 99 percent of the establishments in the CRT in each Census year can be matched to LBD data. The means for the two employment series are very close, but LBD employment has higher standard deviations than does CRT employment (especially in 1987 where the LBD has some large employment outliers). The establishment employment correlations for CRT and LBD data are: 0.58 in 1987, 0.90 in 1992, and 0.94 in 1997.

While the establishment birth and death rates are similar cross the LBD and CRT, the CRT version does have higher birth and death rates than its LBD counterpart. This is not unexpected since the LBD analysts have spent a lot of time repairing broken establishment links and thus are less likely to have false births and deaths. Similarly the job creation and destruction rates are very similar across the two data sources, but the CRT generally has higher job creation and destruction rates than does the LBD (the difference is not as large as it was for the birth and death rates).

Table A1: Summary Statistics for the Retail Trade Sector, LBD and CRT				
Year	Establishments		Employment	
	LBD	CRT	LBD	CRT
1987	1,581,967	1,503,584	18,630,701	17,779,500
1992	1,565,918	1,526,215	19,459,572	18,407,453
1997	1,589,806	1,561,195	22,187,384	21,165,862

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Table 1: Establishment Births and Deaths

A: Establishment Birth and Death Rates						
	Birth Rates			Death Rates		
Area	1982-87	1987-92	1992-97	1982-87	1987-92	1992-97
U.S.	49.1	44.1	42.3	36.0	36.8	34.1
Appalachia	46.5	42.1	39.8	34.6	33.9	31.4
Central	46.4	44.5	41.2	40.8	37.6	33.4
North	42.4	38.7	34.8	33.8	32.1	30.9
South	51.4	45.4	44.8	34.2	35.0	31.5

B: Comparing Establishment Birth and Death Probabilities				
	Average Establishment		Controlling for other Factors[1]	
	Exit	Entry	Exit	Entry
Appalachia	-0.074 *0.002*	-0.057 *0.002*	-0.085 *0.002*	-0.022 *0.002*
Central	0.049 *0.006*	-0.042 *0.006*	0.010 *0.006*	0.046 *0.006*
North	-0.088 *0.003*	-0.177 *0.003*	-0.093 *0.003*	-0.154 *0.003*
South	-0.086 *0.003*	0.060 *0.003*	-0.095 *0.003*	0.100 *0.003*
1/ Factors are industry (two-digit level), branch activity, size, metropolitan status, and years. Standard errors are in italics.				

Table 2: Job Creation and Destruction

A: Job Creation and Destruction Rates						
	Creation Rates			Destruction Rates		
Area	1982-87	1987-92	1992-97	1982-87	1987-92	1992-97
U.S.	51.0	45.0	47.2	37.2	38.2	33.8
Appalachia	44.9	42.9	42.7	36.6	33.2	31.2
Central	43.1	45.4	44.2	43.0	35.1	34.4
North	40.5	39.8	38.8	40.1	32.0	31.8
South	50.0	45.6	46.1	31.7	34.0	30.1

B: Comparing Summary Job Flows							
	Aggregate Rates				Controlling for other Factors[1]			
Area	Net Employment		Reallocation		Net Employment		Reallocation	
Appalachia	-1.55	0.09	-7.51	0.07	1.77	0.10	-3.17	0.06
Central	-4.79	0.33	-2.91	0.23	1.98	0.34	-0.40	0.21
North	-6.49	0.14	-10.21	0.09	-3.82	0.14	-6.44	0.09
South	3.85	0.14	-5.61	0.09	7.39	0.14	-0.27	0.09

C: Comparing Job Creation and Destruction							
	Aggregate Rates				Controlling for other Factors[1]			
Area	Job Creation		Job Destruction		Job Creation		Job Destruction	
Appalachia	-4.53	0.06	-2.98	0.06	-0.70	0.06	-2.47	0.06
Central	-3.85	0.21	0.94	0.19	0.79	0.21	-1.19	0.19
North	-8.35	0.09	-1.86	0.08	-5.13	0.08	-1.31	0.08
South	-0.88	0.09	-4.73	0.08	3.56	0.08	-3.83	0.08

1/ Factors include industry (four-digit level), branch activity, size, metropolitan status and years. Standard errors are in italics.

Table 3: Comparing Dynamics for Retail Trade Using Two Different Datasets

A: Dynamics as Measured by the LBD							
	Establishment Births and Deaths				Job Creation and Destruction		
	Birth Rates		Death Rates		Creation Rates		Destruction Rates	
Area	87-92	92-97	87-92	92-97	87-92	92-97	87-92	92-97
U.S.	43.5	41.3	41.1	38.8	47.2	49.2	42.2	36.2
Appalachia	41.3	38.6	38.5	35.5	47.2	48.9	37.5	32.7
Central	41.9	38.0	40.8	36.2	49.0	49.8	38.9	32.0
North	38.3	34.6	36.8	35.9	44.0	43.9	36.5	34.8
South	44.6	43.0	40.0	35.0	50.4	53.7	38.4	30.6

B: Dynamics as Measured by the CRT							
	Establishment Births and Deaths				Job Creation and Destruction		
	Birth Rates		Death Rates		Creation Rates		Destruction Rates	
Area	87-92	92-97	87-92	92-97	87-92	92-97	87-92	92-97
U.S.	46.5	45.6	45.3	42.6	47.7	51.0	43.7	37.0
Appalachia	44.5	42.3	42.2	39.0	46.9	50.3	39.2	32.8
Central	45.5	41.6	44.1	39.4	50.0	51.1	39.2	33.1
North	41.7	38.7	40.7	39.6	43.8	45.6	38.7	34.8
South	47.4	46.4	43.6	38.4	49.8	55.1	39.7	30.7

Table 4: Decomposition of Labor Productivity Growth, 1987-97

Area	Overall Growth	Within Share	Between Share	Cross Share	Net Entry Share	Birth Share	Death Share
U.S.	11.53	0.15	0.21	-0.36	1.00	0.57	-0.44
Appalachia	8.88	0.02	0.30	-0.43	1.11	0.57	-0.54
Central	7.93	0.14	0.36	-0.55	1.07	0.46	-0.61
North	7.70	-0.07	0.37	-0.48	1.20	0.66	-0.54
South	10.06	0.09	0.22	-0.37	1.06	0.50	-0.56

Table 5: Entry and Exit and Productivity Growth

A: Net Entry Regression Results				
Area	Exit Dummy in Beginning Year (β)	Entry Dummy in Ending Year (δ)	End Year Effect (ν)	F-test on β=δ
U.S.	-0.223 *0.001*	-0.002 *0.001*	0.010 *0.001*	0.0001
Appalachia	-0.209 *0.003*	0.007 *0.003*	-0.008 *0.003*	0.0001
Central	-0.199 *0.010*	-0.025 *0.010*	0.001 *0.010*	0.0001
North	-0.183 *0.004*	0.034 *0.004*	-0.019 *0.004*	0.0001
South	-0.248 *0.005*	-0.027 *0.005*	0.000 *0.005*	0.0001

B: Entering Cohorts Regression Results			
Area	Old Cohort (η)	Young Cohort (μ)	F-test on η = μ
U.S.	0.033 *0.001*	-0.028 *0.001*	0.0001
Appalachia	0.040 *0.003*	-0.020 *0.004*	0.0001
Central	0.012 *0.012*	-0.061 *0.012*	0.0001
North	0.050 *0.006*	0.021 *0.005*	0.0001
South	0.021 *0.006*	-0.065 *0.006*	0.0001

Notes: Results are based upon regressions of pooled 1987 and 1997 data with dependent variable the measure of productivity (in logs) and the explanatory variables including four-digit industry effects, year effects, an exit dummy in 1987 and an entry dummy in 1997. All results are weighted regressions with manhours weights. Standard errors in italics.

Figure 1: Births and Deaths by Productivity Quintiles